

Serial no. 10/065,848
Amendment and Interview Summary
Page 2

LISTING OF THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. §1.121:

1. (currently amended) An open magnetic resonance imaging (MRI) device, comprising:

a main coil ~~for configured to generate~~ a magnetic field ~~for to image~~ a volume, wherein the main coil comprises a first axis, a first radius, and a first axial distance from the volume; and

a plurality of shaping coils comprising second axes, second radii, and second axial distances from the volume, wherein the second radii are radially smaller than said the first radius of the main coil, and wherein the second axial distances are greater than or equal to the first axial distance of the main coil positioned axially further from said volume than said main coil or in a plane of said main coil to shape said the magnetic field in said the volume;

a substantially cylindrical support comprising a third axis and a third radius, wherein the first, second, and third axes are generally aligned with one another, wherein the substantially cylindrical support is disposed radially between the main coil and the plurality of shaping coils; and

a pressure vessel disposed about the main coil, the plurality of shaping coils, and the substantially cylindrical support.

2. (currently amended) The open MRI device of claim 1, ~~further comprising:~~

~~a single unit support structure;~~

wherein said the main coil is positioned on an outer circumferential surface of said the ~~single unit support structure~~ substantially cylindrical support, and

wherein at least one of said the shaping coils is positioned on an inner circumferential surface of said the substantially cylindrical support ~~single unit support structure~~.

Serial no. 10/065,848
Amendment and Interview Summary
Page 3

3. (currently amended) The open MRI device of ~~claim 2~~claim 1, comprising:
~~wherein said single unit support structure comprises:~~

a substantially cylindrical shell;

a hub positioned along a substantially central the third axis of said the substantially cylindrical shell;
support; and

a plurality of gussets positioned within said radially between the substantially cylindrical shell, each of said gussets extending radially outward from said support and the hub.

4. (currently amended) The open MRI device of claim 1, comprising: ~~claim 3,~~
~~wherein said single unit support structure further comprises:~~

at least one support post positioned between a first half and a second half of said the open MRI device;
cylindrical shell, wherein the first half comprises the main coil, the plurality of shaping coils, the substantially cylindrical support, and the pressure vessel, and the second half comprises another main coil, another plurality of shaping coils, another substantially cylindrical support, and another pressure vessel in generally the same arrangement as the first half.

5. (currently amended) The open MRI device of claim 4, wherein said the ~~at least one support post is attached on one end to a flange formed on the pressure vessel in the first half of said cylindrical shell and attached on an opposite end to another flange formed on the other pressure vessel in the second half of said cylindrical shell.~~

6. (currently amended) The open MRI device of claim 3, wherein at least one of:
said the substantially cylindrical shell;
support, said the hub, and said gussets or the gusset
comprises one of stainless steel, aluminum, and or fiber-reinforced composites.

7. (currently amended) The open MRI device of claim 2, further comprising:
at least one ferromagnetic ring positioned on an the outer circumferential surface of said
single unit support structure;
the substantially cylindrical support.

Serial no. 10/065,848
Amendment and Interview Summary
Page 4

8. (currently amended) The open MRI device of claim 7, wherein ~~said~~the at least one ferromagnetic ring is positioned substantially between coils having opposite current directions to shield interactions between the coils having opposite current directions.

9. (currently amended) The open MRI device of claim 7, wherein ~~said~~the MRI device comprises at least four ferromagnetic rings.

10. (currently amended) The open MRI device of claim 2, further comprising:
at least one ~~bucking-shielding~~ coil positioned on ~~an~~the outer circumferential surface of ~~said single unit support structure for the~~ substantially cylindrical support and configured to ~~shielding~~ the magnetic field.

11. (currently amended) The open MRI device of claim 10, wherein ~~said~~the MRI device comprises at least two ~~bucking-shielding~~ coils.

12. (currently amended) The open MRI device of claim 1, wherein ~~said~~the MRI device comprises at least eight shaping coils.

13. (currently amended) The open MRI device of claim 1, wherein at least one of ~~said~~the shaping coils is configured to shape ~~said~~the magnetic field in ~~said~~the volume to a uniformity of at least 10 ppm.

14. (currently amended) The open MRI device of claim 1, wherein ~~said~~the MRI device comprises an even number of shaping coils.

15. (currently amended) The open MRI device of claim 14, wherein a first half of the number of shaping coils have a first magnetic polarity and a second half of the number of shaping coils have a second magnetic polarity substantially opposite that of ~~said~~the first magnetic polarity.

Serial no. 10/065,848
Amendment and Interview Summary
Page 5

16. (currently amended) The open MRI device of claim 1, wherein ~~said MRI device comprises a plurality of shaping coils,~~ at least one of ~~said~~the plurality of shaping coils ~~having has~~ a magnetic polarity opposite to a magnetic polarity of another of ~~said~~the plurality of shaping coils.

17. (currently amended) A magnetic resonance imaging (MRI) apparatus for imaging a volume, comprising:

at least one main coil configured to generate a magnetic field about the volume, wherein the at least one main coil comprises a first axis and a first radius;

at least one bucking coil comprising a second axis and a second radius, wherein the at least one bucking coil is disposed axially outside said at least one main coil with respect to said volume and configured to shield saidthe magnetic field from the at least one main coil;

a plurality of shaping coils comprising third axes and third radii, wherein the plurality of shaping coils are configured to shape saidthe magnetic field in saidthe volume; and

a plurality of ferromagnetic rings for comprising fourth axes and fourth radii, wherein the plurality of ferromagnetic rings are configured to shielding interactions between coils of opposite polarity, wherein the first, second, third, and fourth axes are generally aligned with one another, wherein at least one ring of saidthe plurality of ferromagnetic rings being is positioned axially between saidthe at least one main coil and saidthe at least one bucking coil, wherein the at least one main coil, the at least one bucking coil, and the at least one ring are positioned in a radially overlapping stacked relationship with one another.

18. (currently amended) The MRI apparatus of claim 17, further comprising:

a single unit support structure for configured to supporting saidthe at least one main coil, saidthe at least one bucking coil, saidthe plurality of shaping coils, and saidthe plurality of ferromagnetic rings.

Serial no. 10/065,848
Amendment and Interview Summary
Page 6

19. (currently amended) The MRI apparatus of claim 18, wherein ~~said~~the single unit support structure comprises:

a substantially cylindrical shell;
a hub positioned along a substantially central axis of ~~said~~the cylindrical shell; and
a ~~plurality of~~ gussets positioned ~~within said~~ radially between the substantially cylindrical shell and the, ~~each of said gussets extending radially outward from said hub.~~

20. (currently amended) A magnetic resonance imaging (MRI) apparatus for imaging a volume, comprising:

means for generating a magnetic field for imaging ~~said~~the volume;
means for shielding ~~said~~the magnetic field from means for generating; and
means for shaping ~~said~~the magnetic field radially smaller than ~~said~~the means for generating the magnetic field and positioned axially further from ~~said~~the volume than ~~said~~the means for generating the magnetic field or in a plane of ~~said~~the means for generating the magnetic field; and

means for intermediately shielding at a region at least substantially or entirely directly between the means for generating and the means for shielding, wherein the means for generating, the means for shielding, and the means for intermediately shielding are positioned in an axially stacked relationship with one another.

21. (currently amended) The MRI apparatus of claim 20, further comprising:

means for supporting ~~said~~the means for generating, ~~said~~the means for shielding, ~~and said~~the means for shaping, and the means for intermediately shielding.

22. (currently amended) The MRI apparatus of claim 20, ~~further wherein the means for intermediately shielding comprises:~~

means for intermediately shielding interactions between coils of opposite polarities of the means for generating and the means for shielding.

Serial no. 10/065,848
Amendment and Interview Summary
Page 7

23. (currently amended) An open magnetic resonance imaging (MRI) device, comprising:

first and second main coils ~~for configured to generate~~ a magnetic field ~~for to image~~ a volume; and

first and second sets of shaping coils positioned adjacent to each of ~~said the~~ first and second main coils, respectively, each set of shaping coils being radially smaller than the respective main coil and positioned axially further from ~~said the~~ volume than ~~said the~~ respective main coil or in a plane of ~~said the~~ respective main coil to shape ~~said the~~ magnetic field in ~~said the~~ volume;

a cylindrical support structure comprising a first cylindrical portion and a second cylindrical portion, wherein the first cylindrical portion is disposed radially between the first main coil and the first set of shaping coils, and the second cylindrical portion is disposed radially between the second main coil and the second set of shaping coils; and

an enclosure comprising a first enclosure portion and a second enclosure portion, wherein the first enclosure portion is disposed about the first main coil, the first set of shaping coils, and the first cylindrical portion, and the second enclosure portion is disposed about the second main coil, the second set of shaping coils, and the second cylindrical portion.

24. (new) The open MRI device of claim 1, comprising a ferromagnetic ring disposed in an axially stacked relationship with the main coil.

25. (new) The open MRI device of claim 24, comprising a shielding coil disposed in the axially stacked relationship with the main coil and the ferromagnetic ring.

26. (new) The open MRI device of claim 1, comprising a shielding coil and a ferromagnetic ring, wherein the ferromagnetic ring is disposed directly axially between the main coil and the shielding coil.

Serial no. 10/065,848
Amendment and Interview Summary
Page 8

27. (new) The open MRI device of claim 1, comprising a shielding coil and a ferromagnetic ring disposed between the main coil and the shielding coil, wherein the main coil, the ferromagnetic ring, and the shielding coil are generally positioned in an axially stacked relationship with one another.

28. (new) The open MRI device of claim 27, wherein the pressure vessel is disposed about the main coil, the ferromagnetic ring, the shielding coil, the plurality of shaping coils, and the substantially cylindrical support.

29. (new) The open MRI device of claim 28, comprising a central hub and a gusset disposed radially inside the substantially cylindrical support, wherein the central hub is disposed radially inside the gusset.

30. (new) The MRI apparatus of claim 21, wherein the means for supporting is disposed radially outside the means for shaping and radially inside the means for generating, the means for shielding, and the means for intermediately shielding.

31. (new) The open MRI device of claim 23, comprising:
first and second shielding coils disposed axially about the first and second main coils, respectively; and

first and second ferromagnetic rings disposed axially between the first and second main coils and the first and second shielding coils, respectively.

32. (new) The open MRI device of claim 31, wherein the first main coil, the first ferromagnetic ring, and the first shielding coil are generally positioned in an axially stacked relationship with one another; and wherein the second main coil, the second ferromagnetic ring, and the second shielding coil are generally positioned in another axially stacked relationship with one another.

Serial no. 10/065,848
Amendment and Interview Summary
Page 9

33. (new) A magnetic resonance imaging (MRI) device, comprising:
opposite cylindrical supports disposed about a magnetic resonance imaging region;
opposite shaping coils disposed about the magnetic resonance imaging region, wherein
the opposite shaping coils are disposed concentrically within the opposite cylindrical supports,
respectively;

opposite main coils disposed about the magnetic resonance imaging region, wherein the
opposite main coils are disposed concentrically about the opposite cylindrical supports,
respectively;

opposite ferromagnetic rings disposed concentrically about the opposite cylindrical
supports, respectively; and

opposite shielding coils disposed concentrically about the opposite cylindrical supports,
respectively;

wherein the opposite main coils, the opposite ferromagnetic rings, and the opposite
shielding coils are positioned in an axially stacked relationship along the opposite cylindrical
supports, respectively;

wherein the opposite ferromagnetic rings are disposed axially between the opposite main
coils and the opposite shielding coils, respectively.

34. (new) The MRI device of claim 33, wherein the opposite ferromagnetic rings are
configured to shield interactions between the opposite main coils and the opposite shielding
coils, respectively.

35. (new) The MRI device of claim 33, comprising opposite pressure vessels
disposed about the opposite cylindrical supports, the opposite shaping coils, the opposite main
coils, the opposite ferromagnetic rings, and the opposite shielding coils, respectively.

36. (new) A magnetic resonance imaging (MRI) device, comprising:
an axially stacked MRI arrangement, comprising:
a MRI main coil;

Serial no. 10/065,848
Amendment and Interview Summary
Page 10

a MRI shielding coil; and

a MRI ferromagnetic ring, wherein the MRI ferromagnetic ring is positioned axially between the MRI main coil and the MRI shielding coil in the axially stacked MRI arrangement.

37. (new) The MRI device of claim 36, wherein the axially stacked MRI arrangement is coupled to a single cylindrical support structure.

38. (new) The MRI device of claim 37, comprising a pressure vessel disposed about the axially stacked MRI arrangement and the single cylindrical support structure.